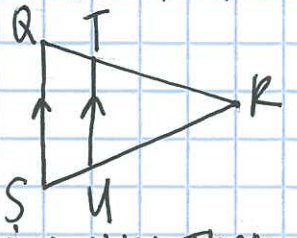
UNIT 5 1H - Proportionality Theorems

① Triangle Proportionality Theorem

If a line parallel to one side of a triangle intersects the other two sides, then it divides the two sides proportionally.

if $\overline{TU} \parallel \overline{QS}$, then $\frac{RT}{TQ} = \frac{RU}{US}$



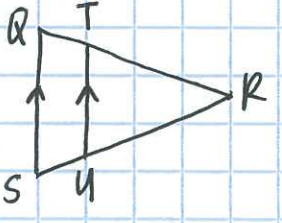
② Converse of the Triangle Proportionality Theorem

If a line divides two sides of a triangle proportionally, then it is parallel to the 3rd side.

if $\frac{RT}{TQ} = \frac{RU}{US}$, then $\overline{TU} \parallel \overline{QS}$.

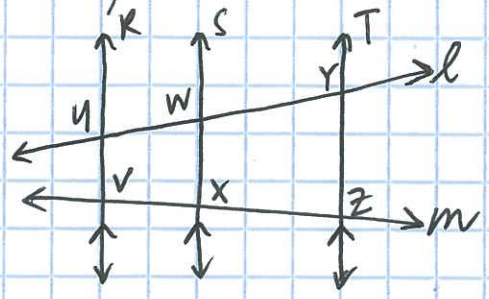
Given: $\overline{QS} \parallel \overline{TU}$

prove: $\frac{QT}{TR} = \frac{SU}{UR}$



S	R
① $\overline{QS} \parallel \overline{TU}$	① Given
② $\angle RTU \cong \angle Q$ $\angle RUT \cong \angle S$	② corresponding angles
③ $\triangle SRQ \sim \triangle URT$	③ AA ~ Thm
④ $\frac{QR}{TR} = \frac{SR}{UR}$	④ def'n of similarity
⑤ $QR = QT + TR$ $SR = SU + UR$	⑤ seg. addition post
⑥ $\frac{QT+TR}{TR} = \frac{SU+UR}{UR}$	⑥ substitution
⑦ $\frac{QT}{TR} = \frac{SU}{UR}$	⑦ simp

③ If 3 parallel lines intersect two transversals then they divide the transversals proportionally



$$\frac{UW}{WY} = \frac{VX}{XZ}$$

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